

The winter-flying adelid *Nematopogon stenochlora* (Meyrick, 1912) discovered in Spain (Lepidoptera, Adelidae)

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Abstract. *Nematopogon stenochlora* (Meyrick, 1912), described from Algeria, is for the first time reported from Europe. The specimens collected in the province of Malaga, Spain have genitalia indistinguishable from the holotype of *N. stenochlora*, although externally they resemble *N. dorsiguttella* (Erschoff, 1877) in their large size and the presence of two prominent white spots on the dorsal forewing margin. Investigation of additional specimens collected in Algeria demonstrated that the external characters of *N. stenochlora* are variable; we update the description of this species accounting for this variation in external characters and also illustrate female genitalia that have not been figured previously. Appearance of *N. stenochlora* in late winter and early spring is the most likely reason behind the elusiveness of this species.

Introduction

The fairy moth genus *Nematopogon* Zeller contains 14 species confined to Eurasia (Nielsen 1985, Kozlov 2001), nine of which are known to occur in Europe (van Nieukerken & Kozlov 2011). The fauna of Spain includes only three species, *N. adansoniella* (Villers, 1789), *N. schwarziellus* (Zeller, 1839) and *N. robertella* (Clerck, 1759) (Vives Moreno 1994; van Nieukerken & Kozlov 2011). The discovery on the southern coast of Spain of a *Nematopogon* that showed no external affinities to any of the European species was therefore astonishing. An attempt to identify this species by using the keys by Nielsen (1985) provided two alternative solutions: while the male genitalia appeared indistinguishable from *N. stenochlora* (Meyrick, 1912), the external characters were most similar to *N. dorsiguttella* (Erschoff, 1877), an East Palaearctic species distributed from Siberia to China and Japan.

The puzzle had been solved only recently, when we had an opportunity to examine the collections of the Natural History Museum (London). Along with the male lectotype and two male paralectotypes (apparently the only specimens that were available to E. S. Nielsen at the time of his revisionary work), this collection houses ten additional specimens of *N. stenochlora* collected in Algeria during 1887–1908. Significantly, all these specimens differ externally from the types of *N. stenochlora*; they have been accessioned and were identified as *N. stenochlora* only a few years ago by one of the authors (M.K.) following examination of the male genitalia.

Considering both variability of *N. stenochlora* and the scarcity of information about this newly discovered representative of the European fauna, we provide descriptions of external characters and female genitalia to allow recognition of this species.

Abbreviations

- BMNH The Natural History Museum, London, U.K.
 ZMUC Zoological Museum, University of Copenhagen, Denmark
 ZMUH Finnish Museum of Natural History, Helsinki, Finland

Systematics

Nematopogon stenochlora (Meyrick, 1912)

(Figs 1, 2)

Nemophora stenochlora Meyrick 1912a: 3. Lectotype, ♂ (designated by Nielsen 1985: 56): Algeria, Skikda (36° 53' N, 6° 54' E); labelled: 8 mm circle with violet border, print 'LECTO- | TYPE'; 8 mm circle with red border, print 'Type'; 4 × 8 mm, black ink 'Philippeville [= Skikda] | Algeria | 13 / 4 / [18]90'; 2.5 × 8.5 mm, print 'Meyrick Coll. | B.M. 1938-290.'; 9 × 14 mm, black frame, black ink + print 'Nemophora | stenochlora | Meyr. | Holo- | TYPE ♂'; 9 × 18 mm, red paper, print + black ink 'LECTOTYPE | Nemophora | stenochlora | Meyr. | design. E. S. Nielsen, 1978'.

Nemophora stenochlora: Meyrick 1912b: 3; Chrétien 1922: 377; Rungs 1979: 27.

Nematopogon stenochlora: Nielsen 1985: 17 (fig. 25, external appearance of a male), 22–24 (keys and phylogeny), 55 (figs 108–111, male genitalia), 56 (description).

Material. **Algeria.** Paralectotypes 2♂♂, collected at same date and place as the holotype; Hammam Righa (36° 23' N, 2° 24' E), 1♂, 21.iii.1905 (Longstaff); Bône [= Annaba] (36° 54' N, 7° 46' E), 4♂♂, 22–23.ii.1886, 2♂♂, 13.iii.1908 (Eaton); El Biar (36° 45' N, 3° 3' E), 20.iii.1893, 1♂ (Eaton); Constantine (36° 22' N, 6° 37' E), 1♂, 1♀, 19.xi.1887 (Staudinger) (all in NHM). **Tunisia.** 5 km E Station de Tamera, 1♀, 21.–25.iii.1986 (Karsholt) (ZMUC). **Spain.** Prov. Malaga, El Mirador, 100 m, 1♂, 1♀, 3.ii.1984 (Traugott-Olsen) (ZMUC); Prov. Malaga, Casares (36° 27' N, 5° 17' W), 350 m, 4♂♂, 3.ii., 9.ii., 4.iii.2003 (Hale) (ZMUC and MZH); 2♂, Prov. Malaga, 1 km E. Casares, 30.i.–3.ii.2009 (Fibiger & Top-Jensen) (ZMUC).

Diagnosis. Due to variability of the external characters, *N. stenochlora* can only be reliably identified by the male genitalia. This species, along with *N. robertella* and *N. caucasica*, has three (or even four – in one exceptional case) stalked pectinifers on the valva, but differs from the other mentioned species by the triangular uncus (Fig. 3). In the female genitalia, *N. stenochlora* is most similar to *N. adansoniella*, from which it differs by the narrow tergite VIII (3.3 × as long as wide) with medially pointed posterior band (Fig. 8). The specimens from Spain differ from all European species of *Nematopogon* by two prominent white marks on the dorsal forewing margin; however, variability of this character in the European population remains unknown (in the specimens from North Africa this character is variable – see below).

Description. Male (Fig. 1): Forewing length 5.5–9.2 mm, width/length ratio 0.29–0.31. Vertex from entirely pale yellow (in syntypes) to brown occipit, with pale yellow scales restricted to narrow line above antennal sockets only (specimens from Spain). Frons from white to pale yellow; palpi and proboscis pale grey brown to light brown. Compound eyes relatively large; frontal distance between eyes subequal to vertical diameter of the compound eye (i.e. interocular index 1.0). Antenna 2.8–3.7 × forewing length. Scape from pale yellow to greyish brown; flagellum uniformly coloured, whitish to light pale yellow. Tegulae and thorax pale ochreous to greyish brown. Forewing from pale ochre, without reticulate pattern (only in some specimens from Algeria), to brownish grey with prominent reticulate pattern (both in specimens from Algeria

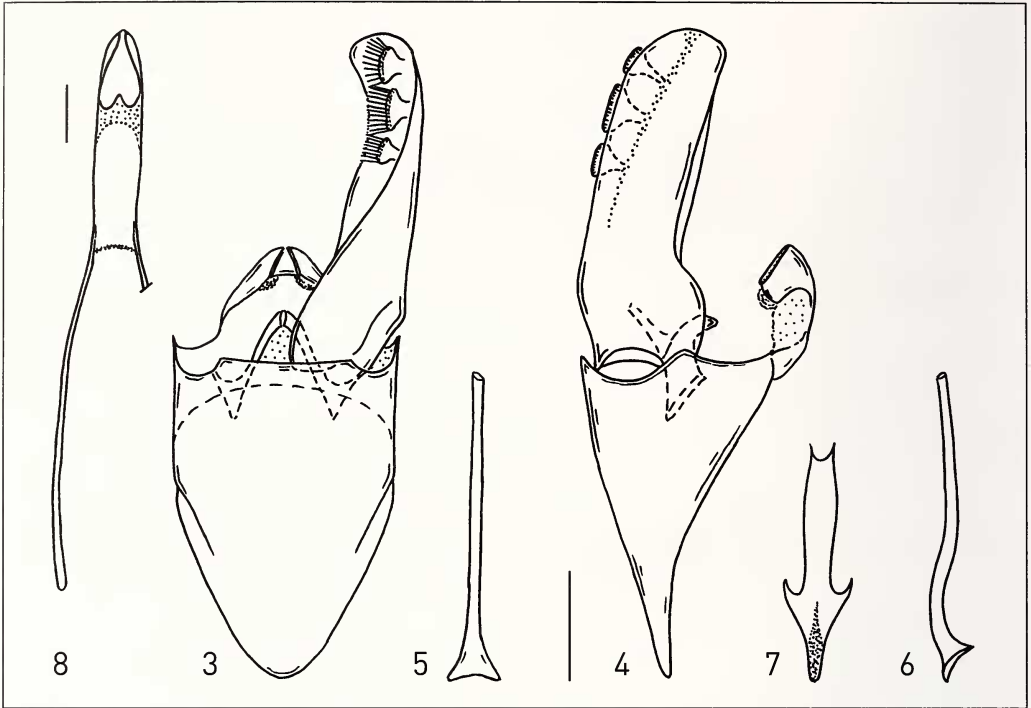


Figs 1, 2. *Nematopogon stenochlora*. 1. female, Spain, prov. Malaga, Marbella, El Mirador, 3.ii.1984; 2. male, Spain, prov. Malaga, Casares, 9.ii.2003.

and Spain); discal spot absent in light specimens (e.g. in syntypes) but present in dark specimens (e.g. those collected in Spain). Cilia from pale ochreous, indistinguishable from forewing colour (e.g. in syntypes) to dark brown, clearly contrasting to forewing background (e.g. in specimens collected in Spain). Light marks on dorsal margin of forewing greatly variable. The tornal mark is always present, although minor (a few scales) and almost indistinguishable in light specimens (e.g. in syntypes); however, even in these extreme situations the light colour of cilia marks its occurrence (this can be seen even in the paralectotype, see Nielsen 1985: 17, fig. 25). The proximal mark (located at approx. $1/3$ of forewing length) is absent in most specimens from Algeria, although traces of it are present in two specimens from Constantine; in contrast, this mark is very distinct (reaching $0.15 \times$ forewing length and $0.20 \times$ forewing width) in specimens from Spain. Hindwing sparsely scaled, semi-translucent, from pale greyish to light brown. Legs light brown. Epiphysis at 0.3 , not reaching apex of tibia. Abdomen greyish brown.

Female (Fig. 2): Similar to male.

Male genitalia (Figs 3–7). Tegumen dome-shaped, without medial ridge; its dorsal surface with triangular plate (termed uncus by Nielsen 1985). Vinculum short, nearly equal to length of valva, with slightly convex lateral margins. Distal $3/4$ of valva of about the same width, base slightly wider; apex of valva broadly rounded. Inner surface



Figs 3–8. *Nematopogon stenochlora*, genitalia (drawn from preparations in glycerol, kept in tubes on the pin of the specimens). 3–7. male, Spain, prov. Malaga, Casares, 4.iii.2003; 3. Genital complex, ventral view (right valva not shown); 4. ditto, lateral view; 5. phallus, ventral view; 6. phallus, lateral view; 7. juxta; 8. female, Spain, prov. Malaga, Marbella, El Mirador, 3.ii.1984; tergite VIII and apophyses posteriores; scales 0.25 mm.

of valva with three stalked pectinifers (exceptionally, one specimen from Spain has four pectinifers on left valva only). Transtilla w-shaped. Phallus nearly equal to length of vinculum, basal half slightly s-shaped in lateral projection; base of phallus swollen; tip membranous, without any sclerotized structures. Juxta $0.7 \times$ length of phallus, arrowhead wide (width/length ratio 0.8), with very narrow apical part ($1/3$ of total length of arrowhead).

Female genitalia (Fig. 8). Apophyses posteriores $0.95 \times$ length of apophyses anteriores. Tergite VIII relatively narrow (3.3 as long as wide), without medial keel; posterior band with triangular medial protuberance. Vestibulum without sclerotization.

Distribution. Southern Spain, northern Algeria, northern Tunisia; also recorded from Morocco (Chrétien 1922).

Remarks. Investigation of additional material demonstrated that, contrary to the diagnosis given by Nielsen (1985), this is one of the largest *Nematopogon* species; only *N. dorsiguttella* and *N. taiwanella* attain a larger size.

One of the Algerian specimens in BMNH has been determined by Durrant as *N. pilella*; however, it seems that this misidentification had not been published. Another specimen bears the label '*Nemophora panzerella* Hb. f. *algericella*, named by St[audin]g[e]r'; however, no publication has been found in which the latter name is made available.



Phenology. The information summarised by Nielsen (1985) indicates that the adults of all *Nematopogon* species fly during spring and early summer, from April to July. Several species are reported to start flying during April. Additional records suggest that *N. stenochlora* is a winter-flying species: in Algeria and Tunisia it was collected from mid-November to mid-April, and in Southern Spain from early February to early March. The average monthly temperature for the collecting period in all localities where *N. stenochlora* had been sampled ranges from 11.1 to 14.8°C (FAO 2006).

Fig. 9. *Nematopogon stenochlora*. Living specimen in resting position, Spain, prov. Malaga, Casares, photo P. Hale.

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References

- Chrétien, P. 1922. [Galleriinae – Micropterygidae]. Pp. 324–379. – In: C. Oberthür (ed.), Les Lépidoptères du Maroc, Etudes de lépidoptérologie comparée **19(1)**: 1–403, pls. 74–124.
- FAO 2006. New_LocClim, Local Climate Estimator Version 1.10. Environment and Natural Resources Service – Agrometeorology Group, FAO/SDRN, Rome, Italy, ftp://ext-ftp.fao.org/SD/SDR/Agromet/New_LocClim/. [Accessed 28.09.2006]
- Kozlov, M. V. 2001. *Nematopogon taiwanella* sp. n. from the mountains of Taiwan (Lepidoptera, Adelidae). – Tijdschrift voor Entomologie **144**: 41–44.
- Meyrick, E. 1912a. Lepidoptera Heterocera (Tineae). Fam. Adelidae. – In: P. Wytzman (ed.), Genera Insectorum **133**: 1–12, 1 pl. – V. Verteneuil & L. Desmet, Bruxelles.
- Meyrick, E. 1912b. Adelidae, Micropterygidae, Gracilariidae [sic!]. – In: H. Wagner (ed.), Lepidopterorum Catalogus 6: 1–68. – W. Junk, Berlin.
- Nieukerken, E. J. van & M. V. Kozlov 2011. Adelidae. In: O. Karsholt & E. J. van Nieukerken (eds), Lepidoptera, Moths. – Fauna Europaea, version 2.4, <http://www.faunaeur.org>. [Accessed 12.1.2011]
- Nielsen, E. S. 1985. A taxonomic review of the adelid genus *Nematopogon* Zeller (Lepidoptera: Incurvarioidea). – Entomologica Scandinavica, suppl. **25**: 1–66.

- Rungs, C. E. E. 1979. Catalogue Raisonné des Lépidoptères du Maroc. Inventaire faunistique et observations écologiques 1. – Travaux de l'Institut Scientifique, Série Zoologie **39**: i–viii, 1–222, A1–A5, 2 maps.
- Vives Moreno, A. 1994. Catálogo sistemático y sinonimico de los Lepidopteros de la Peninsula Iberica y Baleares (Insecta: Lepidoptera) (Segunda parte). – Ministerio de Agricultura, Madrid. x + 775 pp.